

Patent Claims

1. Method for improving a processing time of received data in packet oriented applications in a data transmission between a transmitter and a receiver each comprising a first and a second protocol layer via a communication network, wherein

- data from the first protocol layer are released to the second protocol layer in the transmitter,
- the data of the first protocol layer are divided into consecutive data packets of the second protocol layer,
- the data packets of the second protocol layer are transmitted via the communication network,
- data packets of the second protocol layer received in the receiver are sorted according to the transmitted sequence,
- the data packets received are allocated to data packets of the first protocol layer on the second protocol layer,
- upon a data packet of the first protocol layer has been completely generated, said data packet is released to the first protocol layer.

2. Method according to claim 1, wherein a processing of the data in the transmitter and/or receiver is based on a modular protocol structure.

3. Method according to claim 1 or 2, wherein the data packets of the second protocol layer are numbered consecutively and marked by a corresponding sequence number.

4. Method according to one of claims 1 to 3, wherein the first protocol layer supports at least two transmission modes, a reliable and an unreliable mode.

5. Method according to claim 4, wherein the data packets of the second protocol layer are corrected by means of repeated transmission in case of a transmission error and by using the reliable transmission mode.

6. Method according to one of claims 1 to 5, wherein the data of the first protocol layer are clearly differentiated from each other by means of separators.

7. Method according to claim 3, wherein the received data packets are sorted into a sequence corresponding to a sequence number.

8. Method according to claim 3 or 7, wherein the sequence number is an RLP (Radio Link Protocol) sequence number or an RLC (Radio Link Control) sequence number.

9. Method according to one of the preceding claims 1 to 8, wherein the received data packets are stored in a buffer of the receiver.

10. Method according to one of claims 1 to 9, wherein a data packet of the first protocol layer is brought into a status of a completely generated data packet, if both the initial and the end mark within data packets of the second protocol layer have correctly been received, and if all data packets of the second protocol layer lying in between have correctly been received according to their correct sequence.

11. Method according to one of claims 1 to 10, wherein the completely generated data packets of the first protocol layer are examined according to the rules of an encapsulating process, for identifying packets of additional protocol layers.

12. Method according to one of claims 1 to 11, wherein at least one control field comprising control data is provided in the completely generated data packets of the first protocol layer, for delivering the information in view of a pertinent data flow.

13. Method according to claim 12, wherein the control data are appended to the actual data sequences as control fields in the corresponding protocol layers in form of a header and/or a tail.

14. Method according to one of claims 1 to 13, wherein a data flow is differentiated by means of certain control data in the control fields provided therefor.

15. Method according to claim 14, wherein the control data for differentiating data flows are the addresses of the transmitter and/or receiver in form of source addresses, destination addresses and port numbers.

5 16. Method according to one of claims 1 to 15, wherein the data packets of the first protocol layer are directly released to the first protocol layer on the second protocol layer, if the data packets on the second protocol layer have firstly been received completely and correctly, and if secondly it has been guaranteed that the data possibly buffered by the receiver of the second protocol layer do not contain additional data packets of the first
10 protocol layer belonging to the same data flow of the data packets of the first protocol layer to be released.

17. Method according to one of claims 1 to 15, wherein on the second protocol layer the data packets of the first protocol layer are directly released to the first protocol layer, if
15 said data packets have been received completely and correctly.

18. Method according to claim 1, wherein the data packets of the first protocol layer are IP datagrams and the data packets of the second protocol layer are PPP frames, wherein PPP frames are corrected by means of repeated transmission when an error occurs.
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19. Method according to claim 1, wherein the data packets of the first protocol layer are PPP frames and the data packets of the second protocol layer are RLP data frames.

20. Method according to claim 1, wherein the data transmission is performed via an IP
25 network and a mobile communication network.

21. Method according to claim 1, wherein the packet oriented applications are internet applications.

22. Method according to claims 18 to 21, wherein an internet application is transmitted by means of the transport protocol Transmission Control Protocol (TCP).
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23. Method according to claims 18 to 21, wherein an internet application is transmitted by means of the transport protocol User Datagram Protocol (UDP).

24. Device for improving a processing time of received data in packet oriented applications in a data transmission between a transmitter and a receiver each with a first and a second protocol layer via a communication network, comprising

- means for providing data packets of a first protocol layer to a second protocol layer,
- transmitting means for transmitting the data packets,
- receiving means for receiving the data packets,
- sorting means for sorting the data packets into a sequence of consecutive data packets,
- recognizing means for recognizing a completely combined data packet of the first protocol layer,
- means for examining the association of the data packets to the data flow,
- releasing means for releasing a completely generated data packet to the first protocol layer.

25. Device according to claim 24 comprising a buffer for temporarily storing the received data packets of the second protocol layer.